USACO 2021 December Contest, Silver
Problem 2. Connecting Two Barns

Not submitted yet

English (en) ⌄

Farmer John's farm consists of a set of N fields $(1 \leq N \leq 10^5)$, conveniently numbered $1 \ldots N$. Between these fields are M bi-directed paths $(0 \leq M \leq 10^5)$, each connecting a pair of fields.

The farm contains two barns, one in field 1 and the other in field N. Farmer John would like to ensure that there is a way to walk between the two barns along some series of paths. He is willing to build up to two new paths to accomplish this goal. Due to the way the fields are situated, the cost of building a new path between fields i and j is $(i - j)^2$.

Please help Farmer John determine the minimum cost needed such that barns 1 and N become reachable from each-other.

INPUT FORMAT (input arrives from the terminal / stdin):

Each input test case contains T sub-cases $(1 \leq T \leq 20)$, all of which must be solved correctly to solve the input case.

The first line of input contains T, after which T sub-test cases follow.

Each sub-test case starts with two integers, N and M. Next, M lines follow, each one containing two integers i and j, indicating a path between two different fields i and j. It is guaranteed that there is at most one path between any two fields, and that the sum of $N + M$ over all sub-test cases is at most $5 \cdot 10^5$.

OUTPUT FORMAT (print output to the terminal / stdout):

Output T lines. The ith line should contain a single integer giving the minimum cost for the ith sub-test case.

SAMPLE INPUT:

```
2
5 2
1 2
4 5
5 3
1 2
2 3
4 5
```

SAMPLE OUTPUT:

```
2
1
```

In the first sub-test case, it is optimal to connect fields 2 and 3 with a path, and fields 3 and 4 with a path.

In the second sub-test case, it is optimal to connect fields 3 and 4 with a path. No second path is needed.

SCORING:

- Test case 2 satisfies $N \leq 20$.
- Test cases 3-5 satisfy $N \leq 10^3$.
- Test cases 6-10 satisfy no additional constraints.

Problem credits: Nick Wu

Language: C ⌄

Source File: 选择文件 未选择任何文件

Submit Solution